

2024 GRA Research Group Report

Cropland Research Group

This reporting template is divided into four main sections: 1) Research Group (RG) overview, 2) Networks' information and updates, 3) current and future activities of the Research Group, 4) additional information regarding climate change adaptation co-benefits, collaboration opportunities with other GRA Research Groups/Partners, issues to be addressed at the upcoming GRA Council meeting, key publications produced by Networks.

The Secretariat will use the completed reports to keep up-to-date about RG activities, identify the best ways to support activities moving forward, and communicate activities and achievements both to the Council and the broader public.

1) Research Group Overview

GROUP LEADERSHIP

Co-Chairs:

- Hero T. Gollany (USDA-ARS, USA)
 - Ladislau Martin-Neto (EMBRAPA, Brazil)
 - María Rosa Mosquera-Losada (USC, Spain)
-
- Support Team:
 - Chista Keramati (GRA, Secretariate)
 - Nuria Ferreiro-Domínguez (Newsletter support)

GROUP MEMBERS

[Edit the list below by deleting the countries that do not participate and/or adding the ones that are missing]

Argentina, Australia, Belgium, Benin, Bolivia, Brazil, Cameroon, Canada, Chile, China, Colombia, Costa Rica, Democratic Republic of Congo, Denmark, r, Egypt, Eswatini, Ethiopia, Finland, France, Germany, Ghana, Honduras, Indonesia, Ireland, Italy, Japan, Lithuania, Malaysia, Malawi, Mexico, Mongolia, Namibia, the Netherlands, New Zealand, Nicaragua, Norway, Panama, Paraguay, Peru, Philippines, Poland, Samoa, South Africa, South Korea, Spain, Sri Lanka, Sweden, Switzerland, Thailand, Tunisia, United Kingdom, United States of America, Uruguay, Viet Nam, Zambia, Zimbabwe

MOST RECENT GROUP MEETING

Meeting date and location:

- Croplands Research Group and Integrative Research Group joint meeting with The IX Congreso Internacional de Agroecología in Seville, Spain on the 17th and 18th of January 2023.

Attended by Alliance member countries:

Argentina, Brazil, Canada, China, Ecuador, Egypt, Finland, Germany, Indonesia, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Spain, United Kingdom, United States of America

Participating partner organizations:

INTA, EMBRAPA, AAF/AAC, NSFC, PUCESI, Sohag University, EFI, ZALF, UMY, TEAGASC, CNR, FAO, AFFRC, HVHL, NIBIO, USC, AIA, Hutton.AC, AgMIP, USDA, AGR, IAP, NIAS, AUA (Greece), CIMO (Portugal)

NEXT GROUP MEETING

Meeting date and location:

In person in the USA on November 14, 2024, alongside the American Society of Agronomy (ASA), the Crop Science Society of America (CSSA), and the Soil Science Society of America (SSSA) International Annual Meetings. More information [here](#).

Other information:

GROUP COORDINATION AND COMMUNICATIONS

Regular teleconference:

Co-Chairs (Rosa and Hero) meet twice via Teams on May 2, 2023, and May 18, 2023. Rosa, Ladislau and Hero connected via Teams on July 23, 2024.

Email updates/ Newsletters:

My latest email to all the CRG was on August 22, 2024. We produced several newsletters and provided different webinars, we are also coordinating a paper with our members. We launched several special issues.

Newsletters can be found at the link below:

<https://globalresearchalliance.org/library/croplands-research-group-newsletter-july-2024/>

Social media presence:

- [LinkedIn post](#)
- [Twitter/X post](#)

Participation in other Research Groups and Networks:

Not really due to the relevance of our groups. The IRG proposed to have a joint meeting that we organized in Seville.

RESOURCING

Travel support to attend meetings:

Different projects and institutions support the presence of members in the meetings.

Funding for activities:

Hero Gollany, U.S. Department of Agriculture-Agricultural Research Service and USDA-Office of the Chief Scientist, Research, Education, & Economics for the time spent on the GRA activities and CLIFF-GRADS, CGIAR's Climate Change Agriculture and Food Security program (CCAFS) for students support.

Xunhua Zheng, National Natural Science Foundation of China (NSFC) for the time spent on the GRA

María Rosa Mosquera Losada:

- 1.- SUS-SOIL EU project with the involvement of the GRA that will start next October. The role of deep soil layers as a result of land use will be evaluated to develop a methodology for soil carbon monitoring to be used in Europe (7 million Euros)
- 2.- ERASMUS research exchange with Egypt
- 3.- AF4EU EU project to foster an enhance Agroforestry policy across the globe, where there is money to participate the GRA, who came to different meetings (3 million Euros) and specialized in mitigating climate change by optimizing value chains.
- 4.- GOOD EU project where the role of reducing herbicides in croplands is enhanced by employing agroecological weed management practices (7 million euros)
- 5.- FAO: Inventory methodology for agroforestry agreement with the FAO to help over 200 countries to mitigate climate change by monitoring agroforestry (100000 euros)

Ladislau Martin Neto

1. Fapesp Thematic Project Support (Fapesp, is The São Paulo Research Foundation, a Brazilian Agency) entitled: “Understanding intensified and integrated agricultural production systems: From quantum world to low carbon agriculture”. It is a very innovative project addressing long-term field experiments and on farm research, using advanced tools, including quantum-based spectroscopies and low resolution imaging, mathematical modelling to soil and trees carbon quantification and tropical soil organic matter dynamics. Includes international cooperation with researches from USA, Germany and New Zealand (budget of US\$ 1 Million, duration from November, 2023 to October 2028).
2. Bayer Company (Brazilian branch) and Embrapa joint project, emphasis on on-farm research, entitled: “Balance and carbon footprint in the production of soybean, maize, and sugar-cane: metrics, tools, and protocols to tropical and subtropical areas of Brazilian territory” (budget of US\$ 400,000, duration from September 2022 to August 2025).

WEBSITE PROMOTION

[List title, date and contact person for any upcoming webinars]: Hero, September 2024, Mosquera, December 2024

[List project title and contact person for any projects, events or activities that should be promoted on the GRA Website]

The ones mentioned before. The GRA is already promoting the AFINET Agroforestry alive handbook to be updated by the end of next year.

2) Networks' Information and Updates

Network name	Network coordinators <i>(names and institutions)</i>	Network Update <i>(e.g., communications, meetings, workshops, publications, funding applications, participation in Flagships or other GRA activities, etc.)</i>
<i>Peatland Management</i>	<i>Simon Weldon, NIBIO Norway; Fahmuddin Agus, National Research and Innovation Agency (BRIN), Indonesia</i>	<p>A workshop looking at the knowledge gaps for emission reporting on cultivated organic soils and managed peatlands was conducted on 16 Nov. 2023. Fahmuddin Agus, from the National Research and Innovation Agency (BRIN) Indonesia, presented a paper on “Net greenhouse gas balance from several land covers of Indonesian peatland”, while Junbin Zhao from NIBIO Norway presented a paper on “Peatland greenhouse gas emission measurement needs and an example from Norway”. The workshop was well attended by about 60 participants.</p> <p>Simon Weldon presented during “Stacking 4R Practices with Conservation Agriculture to Mitigate Nitrous Oxide Emissions”. (153 registered and ~ 40 attended).</p>
Greenhouse Gas Research Network, Greenhouse Gas Emissions from Annual Cropping Systems in the Semiarid West - Pendleton	Hero Gollany, USDA, Agricultural Research Service, USA	Action area No.2(AA2)–Greenhouse Gas Research Network Greenhouse Gas Emissions from Annual Cropping Systems in the Semiarid West - Pendleton
Conservation Agriculture and Nutrient Management Network	<i>Craig Drury, Agriculture and Agri-Food Canada</i>	<p>We merged the conservation agriculture and nutrient management network in our last meeting. A soil paper is developed.</p> <p>Presented a webinar “Stacking 4R Practices with Conservation Agriculture to Mitigate Nitrous Oxide Emissions”. (153 registered and ~ 40 attended).</p>
Landscape Management of Agricultural System Network (LMAS)	<i>Xunhua Zheng, Institute of Atmospheric Physics (IAP), Chinese Academy of Sciences (CAS), China</i>	<p>The coordinator, as a chosen expert, participated in the Scoping Meeting on IPCC Scoping Meeting on a Methodology Report on Short-lived Climate Forcers (SLCFs), which was held in Brisbane, Australia on Feb. 26-28, 2024.</p> <p>The high-resolution process-oriented hydro-biogeochemical model CNMM-DNDC, which is developed by, and as a core working model of, the Landscape Management of Agricultural System Network, was chosen as a working model for a newly granted NSFC key project.</p>

Network name	Network coordinators <i>(names and institutions)</i>	Network Update <i>(e.g., communications, meetings, workshops, publications, funding applications, participation in Flagships or other GRA activities, etc.)</i>
		The simulation products of GHG emissions from terrestrial ecosystems at multiple scales, including city (Nanning of Guangxi, 300m spatial resolution), province (Guangxi, 900m spatial resolution), country (China, 30 second spatial resolution) and subcontinent (Southeast Asia, 10km spatial) were included in an exhibition to the ASEAN-China Summit held in 2024.
Agroforestry systems network	<i>Maria Rosa Mosquera Losada, Nuria Ferreiro-Domínguez, Anastasia Pantera</i>	The three coordinators are participating in several EU projects that links internationally the work about agroforestry and agroecology. The projects were AFINET, AE4EU, AF4EU, UNDERTREES collaborating with Ghana, Rhuanda, Chile and Ecuador. The main results are associated and linked to policy. There was also a publication of a special issue about Agroforestry in the Mediterranean areas.
Integrated Crop-Livestock Research Network	<i>Alberto Bernardi, Ladislau Martin-Neto</i>	Approval of Project funded by Fapesp, Brazilian agency, with a long-term field experiment from integrated crop-livestock-forest system, conducted by Embrapa in tropical area, evaluating greenhouse gas emissions and carbon sequestration in the soil and trees. Partnership with private companies to stimulate increasing farmer's adoption of integrated production system in all Brazilian regions, as a conservative production system, and included in the Brazilian Low Carbon Agriculture Plan.

3) Research Group Activities

CURRENT

CURRENT ACTIVITIES					
Activity Name	Outcomes	Members involved	Partners/others involved (if relevant)	Existing funding is provided through (e.g., name of international fund/name country research funding/name of Partner funding or collaboration), including use of any fellowship/exchange programs	Please categorise output as one or more of the following: Capability Building (CB), Research (R), Guidance (G), Policy Support (PS), potential co-benefit with respect to climate change adaptation and resilience (MAC)
Attendance of International Peatland Congress, 4-9 August 2024 in Taizhou, China	Presentation on the topics: (i) Advancing the Emission Inventory of Peat Decomposition in Indonesian Peatlands, (ii) Peat subsidence, (iii) Tree regeneration of burnt forests	Fahmuddin Agus, BRIN Indonesia			CB, R, G, dissemination
CLIFF-GRADS research visit, visit June 2024 – December 2024	The CLIFF-GRADS student Jane Omenda is currently working on a Field experiment using 15N labeled fertilizer to evaluate N use efficiency by cover crops.	Supervision: Alice Budai and Thiago M. Inagaki (NIBIO). Student: Jane Omenda (University of Embu – Kenya)			R, CB
CLIFF-GRADS research visit, visit September 2024 – December 2024	The CLIFF-GRADS student Inviolata Lusweti will be involved in different biochar experiments led by NIBIO, with a focus on the production of biochar-based fertilizers	Supervision: Thiago M. Inagaki and Eva Farkas (NIBIO). Student: Inviolata Lusweti			R, CB

CURRENT ACTIVITIES					
Activity Name	Outcomes	Members involved	Partners/others involved (if relevant)	Existing funding is provided through (e.g., name of international fund/name country research funding/name of Partner funding or collaboration), including use of any fellowship/exchange programs	Please categorise output as one or more of the following: Capability Building (CB), Research (R), Guidance (G), Policy Support (PS), potential co-benefit with respect to climate change adaptation and resilience (MAC)
		(University of Nairobi – Kenya)			
CLIFF-GRADS research visit, April-September, 2024	The CLIFF-GRADS student learnt techniques of soil incubation, field GHG measurements (including photosynthesis analysis) and relevant data processing/analysis. The student also extended working network in Europe.	Junbin Zhao, NIBIO, Norway Carla Stadler, CIFICEN, Argentina	CLIFF-GRADS research visit, April-September, 2024		R, CB
Online workshop "Procinorte online 2024" (2024 North American Workshop on Soil, Water, and Climate Change: Can Models Guide Our Way" March 14, 2024.	Identifying issues that are common to Canada, USA, and Mexico	Hero Gollany, Marlen Eve, and Philip Heilman, USDA-Agriculture Research Service	Canada and Mexico		R, G, PS, MAC

CURRENT ACTIVITIES					
Activity Name	Outcomes	Members involved	Partners/others involved (if relevant)	Existing funding is provided through (e.g., name of international fund/name country research funding/name of Partner funding or collaboration), including use of any fellowship/exchange programs	Please categorise output as one or more of the following: Capability Building (CB), Research (R), Guidance (G), Policy Support (PS), potential co-benefit with respect to climate change adaptation and resilience (MAC)
JOURNALMap (Literature Database) Advisory Board, April 24, 2024; and September 21, 2023	A web base journal article https://jmap.nkn.uidaho.edu/ include currently 30437 Articles	Hero Gollany, USDA-ARS Charles W. Rice, KSU	University of Idaho, Kansas State University, University of Arizona	US Institute for Museum and Library Services (IMLS) Aug 2022 – Jul 2025	R, CB, MAC
CLIFF-GRADS training on CQESTR model and GHG measurements	Trained two CLIFF-GRADS on CQESTR and working on two manuscript revision. Two others were trained on GHG measurements.	Hero Gollany	University of Nebraska	CLIFF-GRADS	CB, R, MAC
Review of the Proposals for Agriculture Innovation Mission for Climate (AIM) for Climate Innovation Sprint proposals	Expanded to include more than 275 partners worldwide, including 42 government partners. (https://www.aimforclimate.org/#partners) Increased investment in climate-smart agriculture and food systems innovation from \$8 billion to \$13.	Hero Gollany (CRG), April Leytem (LRG), James Dobrowolski (IRG), Arlene Adviento-Borbe (PRRG)		The Agriculture Innovation Mission for Climate (AIM for Climate).	R, G, PS, MAC

CURRENT ACTIVITIES					
Activity Name	Outcomes	Members involved	Partners/others involved (if relevant)	Existing funding is provided through (e.g., name of international fund/name country research funding/name of Partner funding or collaboration), including use of any fellowship/exchange programs	Please categorise output as one or more of the following: Capability Building (CB), Research (R), Guidance (G), Policy Support (PS), potential co-benefit with respect to climate change adaptation and resilience (MAC)
Continuation of CRG education and outreach activities	Webinar in June 2024: “Stacking 4R Practices with Conservation Agriculture to Mitigate Nitrous Oxide Emissions” by Dr. Craig Drury, Agriculture & Agri-Food Canada and Dr. Diego Abalos, Aarhus University, Department of Agroecology, Denmark. There were 153 registrations.	Craig Drury, Diego Abalos, and Hero Gollany		In-kind support from Agriculture and Agri-Food Canada/Government of Canada, and Department of Agroecology, Aarhus University, Denmark.	CB
Continuation of CRG education and outreach activities	Webinar in March 2024: “Co-benefits and Tradeoffs of Agricultural Mitigation and Adaptation in Rice Based Cropping Systems” CRG & AgMIP by Dr. Roberto Valdivia, Oregon State University, USA, Dr. Sonali McDermid, New York University, NASA-GISS, USA, Dr. Tao Li, International Rice Research Institute, IRRI, Philippines, and Dr. Erik Mencos, Columbia University, NASA-GISS, USA)	Hero Gollany	CRG members	In-kind support from Oregon State University (Oregon, USA) and Columbia University (New York, USA), NASA-GISS	CB
Greenhouse Gas Research Network- Greenhouse Gas Emissions from	Spatial and temporal GHG (N ₂ O, CO ₂) emissions, and cumulative GHG missions from annual crop and fumigated and non-fumigated potato production under irrigated conditions from semiarid	Hero Gollany	USDA-Natural Resource Conservation Service, and USDA-	USDA-Inflation Reduction Act (IRA).	R, MAC

CURRENT ACTIVITIES					
Activity Name	Outcomes	Members involved	Partners/others involved (if relevant)	Existing funding is provided through (e.g., name of international fund/name country research funding/name of Partner funding or collaboration), including use of any fellowship/exchange programs	Please categorise output as one or more of the following: Capability Building (CB), Research (R), Guidance (G), Policy Support (PS), potential co-benefit with respect to climate change adaptation and resilience (MAC)
Annual Cropping Systems	dryland cropping systems in eastern Oregon.		Agricultural Research Service		
Undertrees project	Thanks to the EU project Understrees the work about agroforestry policy is being carried out. This has been linked to the Agroecology and Agroforestry Flagship	Rosa Mosquera, Nuria Ferreiro	All Undertrees members from Italy, UK, Chile, Ghana, Ruanda, Tanzania and Ecuador	2 Million Euros	CB, PS, MAC
AE4EU project	Thanks to the AE4EU project the work about agroecology definition, indicators and policies has been developed. This has been linked to the Agroecology and Agroforestry Flagship.	Rosa Mosquera, Nuria Ferreiro, Ulrich Schmutz, Alexandre Wetzel	All AE4EU members from 10 EU countries were involved	3 million euros	CB, PS, MAC
AF4EU	Thanks to the AF4EU project the work about LCA linked to value chain climate change mitigation is being developed, also agroforestry policy. This has been linked to the Agroecology and Agroforestry Flagship. The results will be	Rosa Mosquera, Nuria Ferreiro, Anastasia Pantera, Ali Sayed, GRA headquarters	All AF4EU members from 10 EU countries were involved	3 million euros	CB, PS, MAC

CURRENT ACTIVITIES					
Activity Name	Outcomes	Members involved	Partners/others involved (if relevant)	Existing funding is provided through (e.g., name of international fund/name country research funding/name of Partner funding or collaboration), including use of any fellowship/exchange programs	Please categorise output as one or more of the following: Capability Building (CB), Research (R), Guidance (G), Policy Support (PS), potential co-benefit with respect to climate change adaptation and resilience (MAC)
	connected to the agroforestry alive handbook already linked to the GRA web page. The participation of the GRA as part of the Advisory board has been welcome				
SUS-SOIL	A new project where GRA is being involved linked to the development of a methodology to quantify soil carbon sequestration will be developed since next October. GRA headquarters were invited to be part of the advisory board.	Rosa Mosquera, Nuria Ferreiro, Anastasia Pantera, Ali Sayed, GRA headquarters	All SUS-SOIL members that includes GRA members from Europe but also from Turkey, Egypt and Tunisia.	7 million Euros	CB R, PS, MAC
Can trees save the crops? Predicting the services provided by traditional and novel agroforests in changing Mediterranean landscapes	6 articles linked to AF with some GRA members as authors	Rosa Mosquera, Mario Santos, Berta Gonçalves	GRA members from Croatia, Netherlands, Spain, Brazil, Romania, Austria, Portugal	2000	CB, R, PS, MAC

CURRENT ACTIVITIES					
Activity Name	Outcomes	Members involved	Partners/others involved (if relevant)	Existing funding is provided through (e.g., name of international fund/name country research funding/name of Partner funding or collaboration), including use of any fellowship/exchange programs	Please categorise output as one or more of the following: Capability Building (CB), Research (R), Guidance (G), Policy Support (PS), potential co-benefit with respect to climate change adaptation and resilience (MAC)
Services to support the development of the Global FRA study on Agroforestry monitoring	Methodology to develop the inventory of the FAO, this is extremely important because the FRA is the Global Forest Resources Assessments where around 200 countries are delivering inventories to further mitigate climate change	Rosa Mosquera, A Pantera, Nuria Ferreiro, Javier Santiago	FAO headquarters and invited GRA members from all over the world to the workshops	100000 by the FAO	CB, R, G, PS, MAC
Presentation of several EU projects	It was a great pleasure to collaborate with several members of the GRA in asking projects that were not successful, but that we try to resubmit to get funds	Rosa Mosquera	EMBRAPA, CAU, Hutton	No funding provided right now	CB
GREENCOOP proposal	The GREENCOOP first stage proposal went through we will submit now the second stage proposal	Rosa Mosquera	China collaboration and over 20 EU partners	If we go through the second stage then we will have 700000 euros	CB, R, G, PS, MAC
Agroecology and Agroforestry Flagship	Policy about how agroforestry can mitigate and adapt croplands systems to climate change, soil carbon quantification associated with the land use change, monitoring of agroforestry	All CRG	All CRG	With different EU projects we are coordinating this flagship	CB, G, PS, MAC

CURRENT ACTIVITIES					
Activity Name	Outcomes	Members involved	Partners/others involved (if relevant)	Existing funding is provided through (e.g., name of international fund/name country research funding/name of Partner funding or collaboration), including use of any fellowship/exchange programs	Please categorise output as one or more of the following: Capability Building (CB), Research (R), Guidance (G), Policy Support (PS), potential co-benefit with respect to climate change adaptation and resilience (MAC)
	for the governments carbon accountability				
Croplands Conservative practices with on-farm evaluations in different Brazilian regions	Publications with results, including new soil carbon quantification methodology (laser-based spectroscopy) in a joint project between Embrapa and Bayer company (Brazilian branch) with evaluation of croplands areas under conservative tillage, mainly no-till, in private farms from different regions of Brazil, demonstrating soil carbon sequestration in agricultural areas compared to native vegetation (mainly in Savannah areas)	Ladislau Martin-Neto, Débora Milori, Paulino Villas-Boas	Embrapa, Bayer Company (Brazilian branch) and CRG	Funds from Bayer Company (Brazilian branch)	CB, G, PS, MAC
Integrated crop livestock-forest long term experiment results	Several paper published demonstrating improvements in soil fertility and environmental indicators to mitigation of greenhouse gases and carbon sequestration	Alberto Bernardi, Patricia Oliveira, José Pezzopane, Ladislau Martin-Neto	CRG, Embrapa University of São Paulo and Federal University of Paraná	Mainly from project supported by Fapesp (The São Paulo Research Foundation)	CB, R, G, PS, MAC

FE

FUTURE ACTIVITIES					
Activity	Expected Outcomes	Members involved	Partners/others involved (if relevant)	Funding to be sought from – (e.g. name of international fund/name country research funding/name of Partner funding or collaboration)	Please categorise expected output as one more of the following: Capability Building (CB), Research (R), Guidance (G), Policy Support (PS), potential co-benefit with respect to climate change adaptation and resilience (MAC)
Attending Agricultural Greenhouse Gas Symposium, 21-23 Oct. 2024 in Berlin, Germany (www.agrighg-2024.de)	Presentation: Peatland emission reduction and gaps for advancement to tier 3 inventory in Indonesia	Fahmuddin Agus, BRIN Indonesia			R, G, PS
Preparation for GRA-CRG annual meeting, November 14, 2024, in San Antonio, TX, USA. https://www.acsmeetings.org/		Hero Gollany, USDA-ARS and Adam Wilke, USDA-NIFA	GRA	USDA-ARS and USDA- Office of the Chief Scientist	CB, R, G

FUTURE ACTIVITIES					
Activity	Expected Outcomes	Members involved	Partners/others involved (if relevant)	Funding to be sought from – (e.g. name of international fund/name country research funding/name of Partner funding or collaboration)	Please categorise expected output as one more of the following: Capability Building (CB), Research (R), Guidance (G), Policy Support (PS), potential co-benefit with respect to climate change adaptation and resilience (MAC)
Continuation of CRG education and outreach activities	Agroecology and policy, balancing climate change	María Rosa Mosquera-Losada and Hero Gollany 19 September, 2024	GRA and IRG		CB
Flagship on feed additives	Peer reviewed article in special issue of Journal of Dairy Science.	Vibeke Lind			R
Continuation asking projects for funds	Funding to keep working in soils, and cropland systems (agroecology, agroforestry) from an ecosystem and value chain perspective	Rosa Mosquera	GRA CRG members	EU	CB, R, G, PS, MAC

FUTURE ACTIVITIES					
Activity	Expected Outcomes	Members involved	Partners/others involved (if relevant)	Funding to be sought from – (e.g. name of international fund/name country research funding/name of Partner funding or collaboration)	Please categorise expected output as one more of the following: Capability Building (CB), Research (R), Guidance (G), Policy Support (PS), potential co-benefit with respect to climate change adaptation and resilience (MAC)
Continuation with the Agroecology and Agroforestry flagship	Policy about how agroforestry can mitigate and adapt croplands systems to climate change, soil carbon quantification associated with the land use change, monitoring of agroforestry for the governments carbon accountability	Rosa Mosquera	GRA-CRG members	EU	CB, R, G, PS, Mac
FAO FRA monitoring	AF monitoring methodology	Rosa Mosquera and CRG members	CRG members	FAO	PS, G, CB, MAC

4) Additional Information

CLIMATE CHANGE ADAPTATION CO-BENEFITS

The promotion of agroforestry is a co-benefit for climate change adaptation the reduction of herbicides and the increase of carbon sequestration in the soil and in the aboveground.

POTENTIAL COLLABORATION WITH OTHER RGS/PARTNERS

A collaboration with IRG has been initiated but did not crystallize

ISSUES TO BE ADDRESSED AT THE NEXT GRA COUNCIL MEETING

KEY PUBLICATIONS PRODUCED BY NETWORKS

Geremew, B., Tadesse, T., Bedadi, B., Gollany, H.T., Tesfaye, K., Aschalew, A., Tilaye, A., Abera, W. 2024. Evaluation of RothC model for predicting soil organic carbon stock in north-west Ethiopia. *Environmental Challenges*. 15. Article 100909. <https://doi.org/10.1016/j.envc.2024.100909>.

Domnariu, H., Reardon, C.L., Manning, V., Gollany, H.T., Trippe, K.M. 2024. Legume cover cropping and nitrogen fertilization influence soil prokaryotes and increase carbon content in dryland wheat systems. *Agriculture, Ecosystems and Environment*. 367. Article 108959. <https://doi.org/10.1016/j.agee.2024.108959>.

Hussain, T., Gollany, H.T., Mulla, D., Ben, Z., Tahir, M., Tahir Ata-Ul-Karim, S., Liu, K., Maqbool, S., Hussain, N., Duangpan, S. 2023. Assessment and application of EPIC in simulating upland rice productivity, soil water, and nitrogen dynamics under different nitrogen applications and planting windows. *Agronomy*. 13(9). Article 2379. <https://doi.org/10.3390/agronomy13092379>.

Santos M, Mosquera-Losada MR and Gonçalves B (2023) Editorial: Can the trees save the crops? Predicting the services provided by traditional and novel agroforests in changing Mediterranean landscapes. *Front. Ecol. Evol.* 11:1168247. doi: 10.3389/fevo.2023.1168247

Mosquera-Losada MR, Santos MGS, Gonçalves B, Ferreiro-Domínguez N, Castro M, Rigueiro-Rodríguez A, González-Hernández MP, Fernández-Lorenzo JL, Romero-Franco R, Aldrey-Vázquez JA, Sobrino CC, García-Berrios JJ and Santiago-Freijanes JJ (2023) Policy challenges for agroforestry implementation in Europe. *Front. For. Glob. Change* 6:1127601. doi: 10.3389/ffgc.2023.1127601. The paper can be found online in open and in Annex I

Santos M, Cajaiba RL, Bastos R, Gonzalez D, Petrescu Bakış A-L, Ferreira D, Leote P, Barreto da Silva W, Cabral JA, Gonçalves B and Mosquera-Losada MR (2022) Why Do Agroforestry Systems Enhance Biodiversity? Evidence From Habitat Amount Hypothesis Predictions. *Front. Ecol. Evol.* 9:630151.

doi: 10.3389/fevo.2021.630151

Gonçalves B, Morais MC, Pereira S, Mosquera-Losada MR and Santos M (2021) Tree–Crop Ecological and Physiological Interactions Within Climate Change Contexts: A Mini-Review. *Front. Ecol. Evol.* 9:661978. doi: 10.3389/fevo.2021.661978

Ferreiro-Domínguez N, Rigueiro-Rodríguez A and Mosquera-Losada MR (2022) Modeling *Pinus radiata* D. Don growth and pasture production under different land uses and climate scenarios. *Front. Ecol. Evol.* 10:981993. doi: 10.3389/fevo.2022.981993

Mosquera-Losada MR, Santos MGS, Gonçalves B, Ferreiro-Domínguez N, Castro M, Rigueiro-Rodríguez A, González-Hernández MP, Fernández-Lorenzo JL, Romero-Franco R, Aldrey-Vázquez JA, Sobrino CC, García-Berrios JJ and Santiago-Freijanes JJ (2023) Policy challenges for agroforestry implementation in Europe. *Front. For. Glob. Change* 6:1127601. doi: 10.3389/ffgc.2023.1127601

Chalampunte-Flores, D.; Mosquera-Losada, M.R.; Ron, A.M.D.; Tapia Bastidas, C.; Sørensen, M. Morphological and Ecogeographical Diversity of the Andean Lupine (*Lupinus mutabilis* Sweet) in the High Andean Region of Ecuador. *Agronomy* **2023**, *13*, 2064. <https://doi.org/10.3390/agronomy13082064>

Heinrich T, Park H, Orozco R, Ding Z, Alvarez-Lopez V, Mosquera-Losada MR, Steinbeis L, Hoffmann T. Biochar production from late-harvest grass challenges and potential for farm scale implementation. *Sustainable production and consumption* (47): 256-267

Alvarez-Lopez V, Lado-Liñares M, Lamas A, Vázquez B, Mosquera-Losada MR 2023. Past sewage sludge application did not alter soil chemical properties or abundance of most abundant bacterial families in an agroforestry system, *Applied Soil Ecology*, 187, 104820, <https://doi.org/10.1016/j.apsoil.2023.104820>.

Morato Freitas A, Nair VD, Harris WG, Mosquera-Losada MR, Ferreiro-Domínguez N 2022 Pyrolysis-induced phosphorus transformations for biosolids from diverse sources. *Journal of Environmental Quality*. <https://doi.org/10.1002/jeq2.20433>

Babos, D.V.; Tadini, A.M., Morais, C.P., Bareto, B.B., Carvalho, M.A.R., Bernardi, A.C.C., Oliveira, P.P.A., Pezzopane, J.R.M., Milori, D.M.B.P., Martin-Neto, L. 2024. Laser-induced breakdown spectroscopy (LIBS) as an analytical tool in precision agriculture: Evaluation of spatial variability of soil fertility in integrated production systems. *Catena* 239, 107914. <https://doi.org/10.1016/j.catena.2024.107914>

Oliveira, P.P.A., Bernardi, A.C.C., Pezzopane, J.R.M., Bosi, C., Perna Jr, F., Tadini, A.M., Martin-Neto, L., Rodrigues, P.H.M. 2024. Potential of integrated trees-pasture-based systems for GHG emission mitigation and improving soil carbon dynamics in the Atlantic forest biome, Southeastern of Brazil. *European Journal of Agronomy* 158, 127219. <https://doi.org/10.1016/j.eja.2024.127219>

Babos, D. V., Guedes, W.N., Freitas, V.S., Silva, F.P., Tozo, M.L.L., Villas-Boas, P., Martin-Neto, L., Milori, D.M.B.P. 2024. Laser-induced breakdown spectroscopy as an analytical tool for total carbon quantification in tropical and subtropical soils: evaluation of calibration algorithms. *Frontiers in Soil Science*, v. 3, p. 1242647. <https://doi.org/10.3389/fsoil.2023.1242647>

